1. A process to form a copper seed layer on a non-planar surface, comprising:

while maintaining said surface at a temperature less than about -40 C, depositing a first layer of copper by means of a metal plasma technique;

then exposing said surface and said first copper layer to a nitrogen bearing plasma; and

then, by means of chemical vapor deposition, depositing a second layer of copper on said surface and said first copper layer.

2. The process described in claim 1 wherein said metal plasma technique is RF sputtering, magnetron sputtering, or DC sputtering.

3. The process described in claim 1 wherein said metal plasma technique is applied for between about 2 and 10 seconds.

4. The process described in claim 1 wherein said first layer of copper is deposited to a thickness of between about 10 and 50 Angstroms.

5. The process described in claim 1 wherein said first layer of copper has a preferred <111> crystalline orientation.

6. The process described in claim 1 wherein said nitrogen bearing plasma is nitrogen, ammonia, or forming gas.

7. The process described in claim 1 wherein said nitrogen bearing plasma is applied at a pressure of between about 1 x 10^{-2} and 6 x 10^{-2} torr.

8. The process described in claim 1 wherein said nitrogen bearing plasma is applied for between about 5 and 30 seconds.

9. The process described in claim 1 wherein said nitrogen bearing plasma is applied at a power level between about 100 and 300 watts.

10. The process described in claim 1 wherein the step of depositing a second layer of copper by means of chemical vapor deposition further comprises use of cupraselect with hfac and TMVS.

11. The process described in claim 1 wherein said second layer of copper is deposited to a thickness of between about 200 and 800 Angstroms.

12. The process described in claim 1 wherein said second layer of copper has a sheet resistance non-uniformity of less than 4%.

13. The process described in claim 1 wherein said second layer of copper achieves a step coverage of at least 90%.

14. A process to form a dual damascene structure, comprising:

providing a partially completed integrated circuit having a top surface;

depositing a first etch stop layer on said top surface;

depositing a first dielectric layer on said first etch stop layer;

depositing a second etch stop layer on said first dielectric layer;

depositing a second dielectric layer on said second etch stop layer;

depositing a cap layer, having an upper surface, on said second dielectric layer;

etching a via hole that extends downwards through said second dielectric layer and said second etch stop layer as far as said first etch stop layer

then etching a trench that extends downwards from said upper surface through said cap and second dielectric layers as far as said second etch stop layer;

then using plasma and chemical means to strip away any polymeric residues;

then coating all exposed surfaces with a barrier layer having a surface;

while maintaining said structure at a temperature less than about -40 C, depositing,, by means of a metal plasma technique, a first layer of copper on said barrier layer surface;

then exposing said first copper layer to a nitrogen bearing plasma;

by means of chemical vapor deposition, depositing a second layer of copper on said first copper layer, thereby forming a seed layer; and

then electro-depositing copper on said seed layer until said via hole and trench are completely filled with copper, thereby forming said dual damascene structure.

15. The process described in claim 14 wherein said metal plasma technique is RF sputtering, magnetron sputtering, or DC sputtering.

16. The process described in claim 14 wherein said metal plasma technique is applied for between about 2 and 10 seconds.

17. The process described in claim 14 wherein said first layer of copper is deposited to a thickness of between about 10 and 50 Angstroms.

18. The process described in claim 14 wherein said first layer of copper has a preferred <111> crystalline orientation.

19. The process described in claim 14 wherein said nitrogen bearing plasma is nitrogen, ammonia, or forming gas.

20. The process described in claim 14 wherein said nitrogen bearing plasma is applied at a pressure of between about 1×10^{-2} and 6×10^{-2} torr.

21. The process described in claim 14 wherein said nitrogen bearing plasma is applied for between about 5 and 30 seconds.

22. The process described in claim 14 wherein said nitrogen bearing plasma is applied at a power level between about 100 and 300 watts .

23. The process described in claim 14 wherein the step of depositing a second layer of copper by means of chemical vapor deposition further comprises use of cupraselect with hfac and TMVS.

24. The process described in claim 14 wherein said second layer of copper is deposited to a thickness of between about 200 and 800 Angstroms.

25. The process described in claim 14 wherein said second layer of copper has a sheet resistance non-uniformity of less than 4%.

26. The process described in claim 14 wherein said second layer of copper achieves a step coverage of at least 90%.

27. The process described in claim 14 wherein said barrier layer is selected from the group consisting of Cr, Nb, Ti, Mo, W, and Ta or a nitride of a member of said group.

28. The process described in claim 14 wherein said trench has a depth of between about 0.25 and 0.5 microns and a width of between about 0.1 and 0.3 microns.

29. The process described in claim 14 wherein said via hole has a depth of between about 0.5 and 1.3 microns and a diameter of between about 0.1 and 0.3 microns.

30. The process described in claim 14 wherein said dielectric layers are silicon oxide, methyl-doped porous silica, carbon doped silicon oxide, or low k organic polymers.

31. The process described in claim 14 wherein said etch stop layers are silicon nitride or silicon carbide.

32. The process described in claim 14 wherein said second layer of copper has an adhesion strength, within said trench and via hole, of at least 650 N.